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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/768,239	**Applicant(s)** DAMERA-VENKATA, NIRANJAN
	Examiner Mehdi Rashidian	**Art Unit** 2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. **Claim 22** reads as "the machine-readable medium of **claim 22"**, a dependent claim, cannot depend on itself and must further limit any of preceding claims.

Claim Rejections - 35 USC § 102

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-2, 10-12, 20-22, 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Kumar et al. (US Patent 5,963,664) henceforth referred to as Kumar.

Regarding **Claim 1**, Kumar teaches, a machine-implemented method of encoding a target image of a scene captured at a first image plane (fig. 6, abstract, column 3 lines 41-42, functional block diagram of image processing, column 9-10, lines 65-4, captured scene), comprising: computing a transformation mapping at least three noncollinear points substantially coplanar on a scene plane in the target image to corresponding points in a references image of the scene captured at a second image plane different from the first image plane, (figs. 1-3, abstract, column 3, lines 20-33, scene planes of first image and target image, column 6, lines 41-67, registration of 3 dimensional scenes to include coplanar points from first scene...., column 6, lines 20-25, epipolar presentation as shown in fig. 3 for transformation of scenes to target image),

- Identifying at least one point in the target image off the scene plane and at least one corresponding point in the reference image, (fig. 3, column 6, lines 20-25, transformation of scenes within reference image),

- Estimating a motion between the target image and the reference image based on the computed transformation and the identified corresponding off-scene-plane points, (figs. 1-6, abstract, Column 6, lines 41-57, the transformation parameters and motion within images),

- And encoding the target image based at least in part on the estimated motion, (fig. 1, abstract, column 4, lines 20-30).

Regarding **Claim 2**, Kumar teaches, the method of **claim 1**, further comprising identifying the at least three scene plane points in the target image and the at least three corresponding scene plane points in the reference image, (figs. 2-3, abstract, Column 3, lines 25-33, column 5, lines 18-37, the system combines images as shown in element 204 of fig. 2 to be at least three scene planes).

Regarding **Claim 10**, Kumar teaches, the method of **claim 1**, wherein encoding the target image comprises representing points of the target image in terms of the estimated motion and motion compensation difference data representing intensity adjustments to points of the reference image for reconstructing corresponding points of the target image (column 8, lines 1-30, image intensity).

Regarding **Claim 11**, Kumar teaches, an apparatus for encoding a target image of a scene captured at a first image plane (fig. 6, abstract, column 3 lines 41-42, functional block diagram of image processing, column 9-10, lines 65-4, captured scene), comprising an encoder operable to: compute a transformation mapping at least three noncollinear points substantially coplanar on a scene plane in the target image to corresponding points in a references image of the scene captured at a second image

plane different from the first image plane, (figs. 1-3, abstract, column 3, lines 20-33, scene planes of first image and target image, column 6, lines 41-67, registration of 3 dimensional scenes to include coplanar points from first scene...., column 6, lines 20-25, epipolar presentation as shown in fig. 3 for transformation of scenes to target image),

- Identify at least one point in the target image off the scene plane and at least one corresponding point in the reference image, (fig. 3, column 6, lines 20-25, transformation of scenes within reference image),

- Estimate a motion between the target image and the reference image based on the computed transformation and the identified corresponding off-scene-plane points, (figs. 1-6, abstract, Column 6, lines 41-57, the transformation parameters and motion within images),

- And encode the target image based at least in part on the estimated motion, (fig. 1, abstract, column 4, lines 20-30).

Regarding **Claim 12**, Kumar teaches, the apparatus of **claim 11**, wherein the encoder is further operable to identify the at least three scene plane points in the target image and the at least three corresponding scene plane points in the reference image, (figs. 2-3, abstract, Column 3, lines 25-33, column 5, lines 18-37, the system combines images as shown in element 204 of fig. 2 to be at least three scene planes).

Regarding **Claim 20**, Kumar teaches, the apparatus of **claim 11**, wherein the encoder is operable to encode the target image by representing points of the target image in terms of the estimated motion and motion compensation difference data representing intensity adjustments to points of the reference image for reconstructing corresponding points of the target image, (column 8, lines 1-30, image intensity).

Regarding **Claim 21**, a machine-readable medium storing machine-readable instructions for causing a machine (fig. 6, abstract, column 3 lines 41-42, functional block diagram of image processing, column 9-10, lines 65-4, captured scene), to: compute a transformation mapping at least three noncollinear points substantially coplanar on a scene plane in the target image to corresponding points in a references image of the scene captured at a second image plane different from the first image plane, (figs. 1-3, abstract, column 3, lines 20-33, scene planes of first image and target image, column 6, lines 41-67, registration of 3 dimensional scenes to include coplanar

points from first scene...., column 6, lines 20-25, epipolar presentation as shown in fig. 3 for transformation of scenes to target image),

- Identify at least one point in the target image off the scene plane and at least one corresponding point in the reference image, (fig. 3, column 6, lines 20-25, transformation of scenes within reference image),

- Estimate a motion between the target image and the reference image based on the computed transformation and the identified corresponding off-scene-plane points, (figs. 1-6, abstract, Column 6, lines 41-57, the transformation parameters and motion within images),

- And encode the target image based at least in part on the estimated motion, (fig. 1, abstract, column 4, lines 20-30).

Regarding **Claim 22**, the machine-readable medium of **claim 22**, wherein the machine-readable instructions further cause the machine to identify the at least three scene plane points in the target image and the at least three corresponding scene

plane points in the reference image, (Examiner treats claim 22 as dependent claim of claim 21, figs. 2-3, abstract, Column 3, lines 25-33, column 5, lines 18-37, the system combines images as shown in element 204 of fig. 2 to be at least three scene planes).

Regarding **Claim 30**, the machine-readable medium of **claim 21**, wherein the machine-readable instructions cause the machine to encode the target image by representing points of the target image in terms of the estimated motion and motion compensation difference data representing intensity adjustments to points of the reference image for reconstructing corresponding points of the target image, (column 8, lines 1-30, image intensity).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 3-9, 13-19, 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar above, and further in view of Hsu et al. (US Patent 5,742,710) henceforth referred to as Hsu.

Regarding **Claim 3**, Kumar teaches, the method of **claim 1**, while Hsu teaches, wherein estimating the motion comprises defining single-parameter search spaces each relating points in the reference image to respective points in the target image (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 4**, Kumar teaches, the method of **claim 1**, while Hsu teaches the method of **claim 3**, wherein defining the single-parameter search space comprises computing an epipole in the reference image based on the computed transformation and the identified corresponding off-scene-plane points, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 5**, Kumar teaches, the method of **claim 1,** while Hsu teaches the method of **claim 4,** wherein defining a respective single-parameter search space

comprises parameterizing an epipolar line extending through the computed epipole in the reference image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 6**, Kumar teaches, the method of **claim 1,** while Hsu teaches the method of **claim 5**, wherein a respective single-parameter search space is defined for each block of points in the target image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 7**, Kumar teaches, the method of **claim 1,** while Hsu teaches the method of **claim 6**, wherein a respective single-parameter search space is defined by a parameterized epipolar line in the reference image extending through the epipole and a point corresponding to a mapping of a given point in the target image to a corresponding point in the reference image based on the computed transformation, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 8**, Kumar teaches, the method of **claim 1**, while Hsu teaches the method of **claim 3,** wherein estimating the motion comprises dividing the target image into blocks of points and computing for each block a respective motion vector representing motion between a target image block and a reference image block, (figs. 3a-3c, abstract, column 6, lines 27-40, motion vectors with respect to search blocks), it would have been obvious to one of ordinary skill in the art to include method of motion estimation for search blocks to reduce computational complexity.

Regarding **Claim 9**, Kumar teaches, the method of **claim 1,** while Hsu teaches the method of **claim 8**, wherein each motion vector describes a one-to-one mapping between a block of points in the target image and a block of points in the reference image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 13**, Kumar teaches, the apparatus of **claim 11**, while Hsu teaches, wherein the encoder is operable to estimate the motion by defining single-parameter

search spaces each relating points in the reference image to respective points in the target image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 14**, Kumar teaches, the apparatus of **claim 11**, while Hsu teaches the apparatus of **claim 13**, wherein the encoder is operable to define the single-parameter search space by computing an epipole in the reference image based on the computed transformation and the identified corresponding off-scene-plane points, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 15,** Kumar teaches, the apparatus of **claim 11**, while Hsu teaches the apparatus of **claim 14**, wherein the encoder is operable to define a respective single-parameter search space by parameterizing an epipolar line extending through the computed epipole in the reference image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 16**, Kumar teaches, the apparatus of **claim 11**, while Hsu teaches the apparatus of **claim 15**, wherein the encoder defines a respective single-parameter search space for each block of points in the target image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 17**, Kumar teaches, the apparatus of **claim 11**, while Hsu teaches, the apparatus of **claim 16**, wherein a respective single-parameter search space is defined by a parameterized epipolar line in the reference image extending through the epipole and a point corresponding to a mapping of a given point in the target image to a corresponding point in the reference image based on the computed transformation, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 18**, Kumar teaches, the apparatus of **claim 11**, while Hsu teaches, the apparatus of **claim 13**, wherein the encoder is operable to estimate the motion by dividing the target image into blocks of points and computing for each block a respective motion vector representing motion between a target image block and a reference image

block, (figs. 3a-3c, abstract, column 6, lines 27-40, motion vectors with respect to search blocks), it would have been obvious to one of ordinary skill in the art to include method of motion estimation for search blocks to reduce computational complexity.

Regarding **Claim 19**, Kumar teaches, the apparatus of **claim 11**, while Hsu teaches, the apparatus of **claim 18**, wherein each motion vector describes a one-to-one mapping between a block of points in the target image and a block of points in the reference image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 23**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, wherein the machine-readable instructions cause the machine to estimate the motion by defining single-parameter search spaces each relating points in the reference image to respective points in the target image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 24**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, the machine-readable medium of **claim 23**, wherein the machine-readable instructions cause the machine to define the single-parameter search space by computing an epipole in the reference image based on the computed transformation and the identified corresponding off-scene-plane points, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 25**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, the machine-readable medium of **claim 24**, wherein the machine-readable instructions cause the machine to define a respective single-parameter search space by parameterizing an epipolar line extending through the computed epipole in the reference image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 26**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, the machine-readable medium of **claim 25**, wherein the machine-readable instructions cause the machine to define a respective single-parameter search space for

each block of points in the target image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 27**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, the machine-readable medium of **claim 26**, wherein a respective single-parameter search space is defined by a parameterized epipolar line in the reference image extending through the epipole and a point corresponding to a mapping of a given point in the target image to a corresponding point in the reference image based on the computed transformation, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Regarding **Claim 28**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, the machine-readable medium of **claim 23**, wherein the machine-readable instructions cause the machine to estimate the motion by dividing the target image into blocks of points and computing for each block a respective motion vector representing motion between a target image block and a reference image block, (figs. 3a-3c, abstract, column 6, lines 27-40, motion vectors with respect to search blocks), it would

have been obvious to one of ordinary skill in the art to include method of motion estimation for search blocks to reduce computational complexity.

Regarding **Claim 29**, Kumar teaches, the machine-readable medium of **claim 21**, while Hsu teaches, the machine-readable medium of **claim 28**, wherein each motion vector describes a one-to-one mapping between a block of points in the target image and a block of points in the reference image, (figs. 1-4, abstract, column 2, lines 20-40, block matching searches), it would have been obvious to one of ordinary skill in the art to include method of block matching image motion estimation to reduce computational complexity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehdi Rashidian whose telephone number is (571) 272-9763. The examiner can normally be reached on Mon-Thurs 9:00AM to 8:00PM, ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MMR
11/26/2007

SAMIR AHMED
SUPERVISORY PATENT EXAMINER